

다양한 온도에서 열처리한 씨앗 층 위에 열수화법을 이용한 ZnO 나노 막대의 성장

배영숙, 김영이, 김동찬, 공보현, 안철현, 최미경, 우창호, 한원석, 조형균*
성균관대학교 신소재공학과

Abstract : ZnO-based materials have been extensively studied for optoelectronic applications due to their superior physical properties such as wide direct bandgap (~3.37 eV), large exciton binding energy (~60 meV), high transparency in the visible region, and low cost. Especially, one-dimensional (1D) ZnO nanostructures have attracted considerable attention owing to quantum confinement effect and high crystalline quality. Additionally, various nanostructures of ZnO such as nanorods, nanowires, nanoflower, and nanotubes have stimulated the interests because of their semiconducting and piezoelectric properties. Among them, vertically aligned ZnO nanorods can bring the improved performance in various promising photoelectric fields including piezo-nanogenerators, UV lasers, dye sensitized solar cells, and photo-catalysis. In this work, we studied the effect of the annealing temperature of homo seed layers on the formation of ZnO nanorods grown by hydrothermal method. The effect of annealing temperature of seed layer on the length and orientation of the nanorods was investigated scanning electron microscopy investigation. Transmission electron microscopy and X-ray diffraction measurement were performed to understand the effect of annealing temperatures of seed layers on the formation of nanorods. Moreover, the optical properties of the seed layers and the nanorods were studied by room temperature photoluminescence.